

CLAIMS

WHAT IS CLAIMED IS:

1. An ultrasonic cleaner comprising:

2 a tub having a bottom and an open top for containing a liquid for
cleaning;

4 an ultrasound unit comprising an ultrasound transducer and sensor,

wherein the ultrasound unit engages the bottom of the tub;

6 a water unit for providing cleaning liquid and a rinse liquid to the tub;

and

8 a fixture assembly for holding items to be cleaned, wherein the fixture

assembly is disposed within the tub.

2. The ultrasonic cleaner of claim 1 further comprising an airflow unit for

2 directing air towards the fixture assembly.

3. The ultrasonic cleaner of claim 1, wherein the tub further comprises at

2 least one pair of flanges disposed on at least two ends of the tub sides, wherein

the flanges contact a portion of a support frame to support the tub.

4. The ultrasonic cleaner of claim 1, wherein the fixture assembly

2 comprises a first end disk having a perimeter and a center axis and a second end

disk having a perimeter and a center axis, and wherein the first end disk and the
4 second end disk are spaced apart by a shaft.

5. The ultrasonic cleaner of claim 4, wherein the first and second end disks
2 comprise a plurality of slots spaced along their respective perimeters.

6. The ultrasonic cleaner of claim 5, wherein the slots on the second end
2 disk have closed sides to form closed slots.

7. The ultrasonic cleaner of claim 6, wherein the slots on the first end disk
2 comprise an open side to form open slots.

8. The ultrasonic cleaner of claim 5, wherein the first and second end disks
2 respectively comprised a pattern of alternating closed and open slots.

4 9. The ultrasonic cleaner of claim 8, wherein the closed slots on the first
end disk align with open slots on the second end disk when the fixture assembly
6 is configured to receive the items to be cleaned.

8 10. The ultrasonic cleaner of claim 5, wherein at least one of the slots
comprises a hook element.

11. The ultrasonic cleaner of claim 10, wherein the hook element is disposed
2 at an angle relative to the slot, and wherein the angle is towards the interior of
the slot.

12. The ultrasonic cleaner of claim 5, wherein the slots are disposed on at
2 least one of the first or second disks at an angle relative to the respective center
axis of the first or second end disk.

13. The ultrasonic cleaner of claim 1, wherein the items to be cleaned are
2 slats used in slat counting devices for packaging a quantity of product into a
container.

14. An ultrasonic cleaner for cleaning slats used in a slat counting device
2 comprising:

4 a tub having a bottom and a top for containing a liquid for cleaning;
the ultrasonic unit engages the tub;

6 a rinse water unit for providing cleaning liquid and a rinse liquid to the
tub; and

8 a fixture assembly for holding a plurality slats to be cleaned, wherein the
fixture assembly is disposed within the tub, and wherein the fixture assembly
10 comprises a first end disk having a perimeter and a center axis and a second end

12 disk having a perimeter and a second axis, and wherein the first and second end disks are spaced apart by as shaft.

15. The ultrasonic cleaner for cleaning slats as claimed in claim 14, wherein
2 the first end disk and the second end disk comprise a plurality of slots along
their respective perimeters.

16. The ultrasonic cleaner for cleaning slats as claimed in claim 14, wherein
2 the first end disk comprises at least one slot having closed ends to form a closed
slot and wherein the second end disk comprises at least one slot comprising an
4 open end to form open slots.

17. The ultrasonic cleaner of claim 16, wherein the open slots further
2 comprise a hook element and wherein a first end of the slat is seated into the
closed slot on the first end disk and a second end of the slat is seated into the
4 open slot and secured by the hook element.

18. The ultrasonic cleaner for cleaning slats as claimed in claim 14, wherein
6 the first end disk and the second end disk have a first locked position and a
8 second locked position and wherein the first and second end disk move slidingly
along the shaft in the second position to adjust the fixture assembly to
10 accommodate slats of different lengths.

19. A method for ultrasonically cleaning items having a first end and a
2 second end, said method comprising the steps of:

4 Loading the items onto a fixture assembly comprising a first end disk and
a second end disk spaced apart by a shaft, wherein the items are loaded by
6 contacting the first end to a first slot disposed in the first end disk and the
second end to a second slot disposed in the second end disk;

8 Causing the fixture assembly to rotate within a tub comprising cleaning
liquid;

10 Actuating an ultrasound unit to impart ultrasound to the cleaning liquid
as the fixture assembly rotates, said ultrasound unit comprising an ultrasound
12 transducer and sensor;

14 Draining the cleaning liquid from the tub;

16 Causing rinse liquid to be directed onto the items to be cleaned;

18 Draining the rinse liquid from the tub;

20 Causing air to be directed towards the items to be cleaned to dry the
items; and

22 Removing the items from the fixture assembly.

24 20. The method of claim 19, further comprising the step of causing the
fixture assembly to rotate after draining the cleaning liquid from the tub.

21. The method of claim 19, wherein the second slot comprises an open end
2 and a hook element and wherein the items to be cleaned are loaded by seating
the second end on the hook element.

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22. The method of claim 21, further comprising the step of seating the
6 second end of the item to be cleaned in the hook element after seating the first
end in the first slot.

23. The method of claim 22, comprising the further step of seating the
2 second end of the item to be cleaned in the second slot, wherein the second slot

has closed sides.

24. The method of claim 19, further comprising the step of causing the
2 fixture assembly to rotate after draining the rinse liquid from the tub.

25. The method of claim 19, comprising the further step of directing forced
2 air over the items to cleaned to dry said items.